

## Remarks

The present Amendment accompanies a 37 CFR 1.114 Request for Continued Examination (RCE), a petition a two-month extension of time, and the appropriate fees.

### For the Specification:

The present Amendment amends the specification to more closely align the specification with the claims without adding new subject matter. In each of the claims, the drive pin has a "ballistic" or "bullet-shaped" tip. The phrase "ballistic tip 40 is preferably bullet shaped" in the paragraph beginning on page 9, line 11, has been amended to read "ballistic tip 40 is bullet shaped" to more completely agree with the claims.

### For the Claims:

The 26 February 2003 Final Office Action rejected claims 1-20. This Amendment amends claims 1, 13, and 20. The Applicant respectfully requests reconsideration of the claims.

This Office Action has rejected claims 1-4, 8, 11, and 12 under 35 U.S.C. 102(b) as being anticipated by *Ditka et al.*, U.S. Patent No. 5,867,958 (hereinafter *Ditka*). The Office Action asserts that *Ditka* discloses a drive pin comprising a shank with a head at one end, a "ballistic" tip at the other end, and a knurl formed as parallel spiral grooves angled relative to the longitudinal axis of the shank, where the angle of the grooves is disclosed as between 0° and 45°. This Office Action goes on to assert that the shank includes a "base diameter" larger than the diameter of the grooves.

The present Office Action asserts that the term "ballistic" is not limiting in that a tip of any shape may be considered "ballistic." It appears that the present Office Action considers the term "ballistic," as used in the claims, to be a null word, i.e., a word without meaning. This is not so.

The adjective "ballistic," as used in the present application, refers to the shape of the tip and no other properties of the tip. In the specification, the Applicant states: "...ballistic tip 40 is bullet shaped." The word "ballistic" is therefore substantially synonymous with the term "bullet-shaped." The Applicant has amended the independent claims 1, 13, and 20 to read "a bullet-shaped tip" instead of "a ballistic tip" to eliminate any potential for confusion.

*Ditka* teaches an "anchor bolt 116... [comprising] a pointed tip portion 122, a head portion 124, and a shank portion 126 extending between the pointed tip portion 122 and the head portion 124." The tip of *Ditka* is pyramidal, and demonstrably not bullet shaped. In addition, since the use of the tip of *Ditka* is simply to guide the fastener into a pre-drilled hole, there would be no benefit to making the tip of *Ditka* bullet shaped. There is therefore no suggestion to modify *Ditka* to have a bullet-shaped tip. It would not be obvious to one of ordinary skill in the art to modify the tip of *Ditka*.

The present Office Action also asserts that the term "base diameter" is simply an arbitrary value and is given no reference point. The Office Action has read "base diameter" as being at a distance greater than the troughs between the ribs and the height of the ribs (or the grooves).

In the paragraph beginning on page 9, line 11, of the specification, the Applicant states that the drive pin has a

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substantially cylindrical shank having a head on one end and a tip on the other end, that the tip is bullet shaped, and that this shape allows the tip to pierce a framing member and create an opening substantially equal to the base diameter of the shank. In other words, the shape of the tip is such that the maximum diameter of the tip is substantially equal to the base diameter of the shank. (If this were not the case, then the tip would not create an opening substantially equal to the base diameter.) This is shown in FIG. 1, where the base diameter (30) is the diameter of the shank (28) where the shank (28) joins the ballistic (bullet-shaped) tip (40).

In the paragraph beginning on page 9, line 32, of the specification, the Applicant goes on to state that the shank has a knurl formed of a plurality of threads rolled full upon a portion of the shank. There also exists an unthreaded portion of the shank adjacent to the tip, i.e., between the tip and the knurl. This unthreaded portion of the shank is clearly demonstrated in FIGs. 1, 5, 6, and 7.

In claim 1, the Applicant claims "a substantially cylindrical shank, a first portion of which has a base diameter," "a knurl rolled upon a second portion of said shank...having a plurality of substantially parallel spiral grooves...[having] a minor diameter less than said base diameter," and "a bullet-shaped tip coupled to said first portion of said shank." The base diameter is the diameter of the shank proximate the tip. The grooves therefore have a minor diameter less than the diameter of the shank proximate the tip. This is supported in the paragraph beginning on page 10, line 32, of the specification, where the Applicant states:

Threads 44 are rolled full upon shank 28. This means that ridges 34, constituting the outer portions of threads 44, are

fully formed and not truncated. By being fully formed, threads 44 cut into and deform the opening in framing member 22 formed by ballistic tip 40. Referring to FIGs. 1, 3, and 4, shank 28 is of base diameter 30. The process of rolling threads 44 onto shank 28 has deformed shank 28 to produce spiral grooves 32 and spiral ridges 34. Nadirs 56 of spiral grooves 32 form a minor diameter 58 less than base diameter 30. Similarly, apexes 60 of ridges 34 form a major diameter 62 greater than base diameter 30.

With respect to the diameters of the shank and ribbed portions of the fastener, *Ditka* teaches (column 6, lines 9-17):

It is further appreciated that the relatively smooth, first shank portion 132 of the anchor bolt 116 has an external diametrical extent or dimension  $D_1$ , as noted in FIGS. 2 and 3, whereas the external diametrical extent or dimension of the second shank portion of the anchor bolt 116, as taken through or along a diametrical plane extending through the substantially axially extending ribs 128, has a predetermined value  $D_2$  which is substantially greater than the diametrical extent or dimension  $D_1$ , as noted in FIG. 3 and 4.

The shank of *Ditka* has a diameter of  $D_1$ , which defines the base diameter. The ribs and grooves of *Ditka* have a major diameter of  $D_2$ , which is substantially greater than  $D_1$ . There is no mention in *Ditka* of a minor diameter for the ribs and grooves. The Figures of *Ditka* which show the diameters, most notably FIGs. 2, 3, 4, 6, and 7, show the ribs and grooves as having a minor diameter substantially equal to the base diameter.

In the present invention, the minor diameter is less than the base diameter to allow space for the displacement of the material being fastened. This is unnecessary in the case of *Ditka*, as the diameter of the predrilled hole is larger than base (shank) diameter and itself provide the needed displacement space. There is therefore no advantage to modifying *Ditka* to have a minor

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diameter less than the base diameter. It would not be obvious to one of ordinary skill in the art to perform such a modification.

The Applicant has amended claim 1 to more clearly define the shape of the tip, and also to more clearly define the base and minor diameters. The Applicant believes that independent claim 1 is allowable as currently amended. Claims 2-4, 8, 11, and 12 depend, directly or indirectly, from independent claim 1 and are therefore allowable by reason of dependency. The Applicant respectfully requests reconsideration of claims 1-4, 8, 11, and 12.

This Office Action has rejected claims 1-20 under 35 U.S.C. 103(a) as being unpatentable over Dove, U.S. Patent No. 3,977,142 (hereinafter *Dove*) in view of Ditka, and further in view of Rosenberg, U.S. Patent No. 1,485,202 (hereinafter *Rosenberg*). The Office Action asserts that Dove teaches all of the requirements of the present invention except the angle of the spiral grooves or flutes, and that this angle is taught by Ditka.

The present invention uses a bullet-shaped tip. The use of a bullet-shaped tip for the present invention was not an optional design choice. A bullet-shaped tip was specifically chosen to provide the cleanest, roundest hole possible in the sheet-metal substrate.

Fasteners with flattened tips, such as Ditka, exert unequal radial pressures upon the sides of the hole as it is formed. This causes the sheet-metal substrate to tend to peel (like a banana), and provides a relatively poor bond.

Fasteners with star or fluted tips, such as Rosenberg, cut into the sheet-metal substrate and produce an even greater "banana-peel" effect than those with flattened tips.

Fasteners with conical tips, such as Dove, exert substantially constant radial forces as the hole is opened. Since the material around the hole is stretched as the size of the hole is increased, these substantially constant radial forces tend to cause the material around the hole to crack and split. This results in an asymmetrical hole, which often leads to deformation of the sheet-metal substrate and a less-than-optimal strength of join. This exact problem is depicted in FIG. 4 of Dove, where the distortion is quite evident.

A fastener with a bullet-shaped tip exerts maximum radial stress at the moment the hole is made, then rapidly decreases the radial stresses as the hole is enlarged. This results in reduced chances of asymmetry and distortion. The bonds are therefore stronger and cleaner, and the substrate members stay in greater alignment.

Neither Rose nor *Ditka* teaches a bullet-shaped tip. Indeed, none of the prior art cited against the present invention teaches a bullet-shaped tip for any fastener used to fasten objects to a sheet-metal substrate. Therefore, there is no suggestion to use a bullet-shaped tip for any fastener to one of ordinary skill in the art of sheet-metal fasteners.

The Applicant has amended independent claims 1, 13, and 20 to more clearly claim a bullet-shaped tip. The Applicant believes independent claims 1, 13, and 20 are allowable as currently amended. Claims 2-12 depend, directly or indirectly from independent claim 1, and claims 14-19 depend, directly or indirectly from independent claim 13. Claims 2-12 and 14-19 are therefore allowable by reason of dependency. The Applicant respectfully requests reconsideration of claims 1-20.

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Accordingly, this Amendment amends independent claims 1, 13, and 20. Currently-amended claims 1, 13, and 20 remain in the application and are believed to be allowable. In addition, claims 2-12 and 14-19 remain in the application as previously submitted and are believed to be allowable.

Applicant believes that the foregoing amendments and remarks are fully responsive to the rejections recited in the 26 February 2003 Office Action and that the present application is now in a condition for allowance. Accordingly, reconsideration of the present application is respectfully requested.

Respectfully submitted,



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